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ABSTRACT

This speech, addressed to school administrators, outlines the reasons for implementing instruction in the metric system and offers advice on several aspects of this implementation. The author observes that although the primary responsibility for teaching metric measurement will fall on the mathematics teacher, other teachers (e.g., science, vocational education) will need to use the metric system in their classes, and, therefore, recommends in-service programs for all teachers. These programs should aim at development of the ability to use measuring instruments and to estimate quantities in metric terms, rather than at conversion of units. Parent education nights are also advocated. A list of basic equipment needed for metric instruction and another of journals and other resources concerned with the metric system are provided. (SD)

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MOVING TO METRICS IN OUR SCHOOLS*

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"Moving to Metrics in our Schools"--when? What deadlines? A law? What do I need to do? My schools are already deeply involved in moving to metric measurement. Should we be doing more?" These questions may be among those that flash through the mind of a school administrator already confronted with many and varied issues and problems for decision making.

Background

Although most of the rest of the world uses the metric system, adopted by France in 1765, by England and Canada during this decade, and by a majority of the rest of the world's nations during the intervening years, we Americans are still in the 11th Century--in our method of measuring. Congressional supporters for metrication tried, but failed last year, to move the United States into the 20th Century and into step with the rest of the world. Bills again are being contemplated and there is good reason to think that some kind of metrication bill will pass by Summer, 1975.

Whether Congress acts or not in the near future, world trade virtually demands that the United States go metric. In fact, some sectors of industry are actively moving toward metric measurement. To cite a few, General Motors has been a leader in the movement. Ford and Chrysler have commitments on a less advanced scale; General Electric

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is starting to go metric. Seven-Up is introducing six-packs in half-liter bottles this year, and is replacing the quart (32 oz) bottles with a one-liter bottle (33.82 oz). There are others who are taking more or less a "wait-and-see" attitude. Certainly costs are a factor. It is obvious that if recession continues, some industries "will be reluctant to talk about metrication" because of the cost. Of course, the many activities necessary to move a nation to metric could reduce unemployment.

In an event, today's children will live in a largely metric world. It is one of the responsibilities of the school to try to prepare the children and youth for the world in which they will live. Furthermore, if we can profit from a country already involved in the transition, namely the British, who say, "If we had to make the transition again, we would do more preparing in the schools." Certainly if we can catch youngsters now, that is one whole generation we will not have to unlearn.

The Role of the Administrator

If the decision is made to teach the metric system in your school, what should you do first?

Certainly, you need to become knowledgeable about the system.

You also should be aware of legislation both at the state and national levels. According to a survey made last summer by the Metric Infromation Office in the National Bureau of Standards, nineteen states indicated some type of formal action by their State Legislature and/or State School Board. Forty-three states indicated some other type of formal state-level activity. Only one of the 50 states indicated no formal, state wide activity related to metric education.

You should understand how it works and its advantages and its disadvantages.

Of course, you should use the metric system yourself. THINK METRIC POSITIVELY.

Then see that your teachers are properly trained to use it and to teach it. This implies inservice education.

Inservice education--how long? What should be stressed? What teachers involved?

Approximately ten to fifteen clock hours of good instruction would seem most adequate. After all, we are talking of just another system of measure and concept of measurement has been one topic in mathematics through the years. Ideally it seems best to meet in about half-dozen weekly sessions of 90 to 100 minutes each. This provides time for reflection (and absorption) of the ideas, and time to prepare displays and teaching materials to be used in the classroom.

As for what is to be stressed, certainly the basic units of the metric system, their interrelationship with each other, and the proper symbols. There are three basic units upon which to build multiples of the unit or parts of the units for measurements of length, weight (mass) and volume. The fourth measurement is temperature.

More important, however, insofar as possible, the teachers should learn to use the common metric units. They should learn to make reasonable estimates of length, mass, capacity, and temperature. They should THINK METRIC. These estimates should be made directly in metric units, not in U. S. Customary units and then converted to metric units. To do this, they should be given ample experiences in making estimates and then verifying

their estimates with hands-on measuring activities. Should the inservice program be only for teachers of mathematics? Although we can expect that the directed learning experience for developing measurement concepts and units of measure to continue to be the responsibility of the mathematics teachers as it has been in the past, other faculty will be using metric measure too--teachers of social science, science, vocational sciences, home economics, art, to name a few. Thus, although the mathematics teachers can be expected to need more time for the preparation of learning opportunities for students, the entire faculty should have familiarity and competency in using metric measure and thinking metric.

Parent Education

Should there be an communication with parents? Certainly. Parents can be expected to show much interest. There will be more interest when it gets into their pocketbook at the store counter. Already many labels display metric measures. For the seamstress, patterns also have metric units printed on them. The challenge to understand what one is getting for his money is motivation to seek that information. It is much better to enlist their aid by informing them rather than their antipathy by ignoring their questions. Parents "back to school nights" for the study of metric measure can be most helpful activity. Sending home frequent communications about the metric system can be another effort for parent involvement and information.

Cost

As mentioned earlier, the cost for industry can be expected to be great. What is the cost for the schools? As for many materials for

the teaching of mathematics, much can be done using inexpensive materials. Generally speaking materials are needed for the same kind of measurements as were needed for the U. S. Customary units. More specifically for

Linear and Area Measure

Centimeter rulers (30 cm) for short lengths

(50 cm) one-half a meter

Meter stick - (marked in centimeters and millimeters)

Meter tape - at least 150 centimeters

Wall strips -

Graph paper - marked in centimeter squares

Geoboards - (nails driven at 2 cm intervals)

For Volume and Capacity

Centimeter cubes

If weight of each cube can be one gram, the cubes can provide excellent materials for experiments in mathematics and science classes.

For Dry Measure Containers

One liter, ½ liter, ¼ liter, 1/10 liter

For Liquid measure containers

one liter and two liter containers. each marked in milliliters at intervals of 50, 100, 250, etc.

For Weights and Mass Measure

Gram - kilogram

Balance scale and weighing scale

For Temperature

Celsius thermometer

A casual glance around the exhibit hall at any educator's conference will show that plenty of metric equipment is available. Publishers are eager to supply you with it. Much of the equipment is of excellent quality. Of course, there is lesser quality too. The National Council of Teachers of Mathematics Metrication Committee is in the process of developing some guidelines with respect to criteria for selecting materials.

You can also have a good metric program developed on a shoestring. It would be helpful to supply each classroom with a meter stick and some metric rulers. There is much to be said, however, in favor of having students make their own rulers with adding machine tape. Balance scales can be built with a coat hanger on a hook. Bottles and containers from home can be used when teaching units on capacity and volume. The cost need not be great unless you have plenty of money in your budget and are searching for ways to spend it.

Resources

There are resources available to you. Among those resources are the *NCTM Handbook for Teachers on Metrication and *annotated bibliography, prepared by a joint committee on NCTM and the American Association of School Librarians. Other organizations and resources are:

U. S. Metric Association founded in 1919 primarily concerned with conversion

*The Bureau of Standards Kit (single copy available)

National Council of Teachers of Mathematics, housed at their national offices, probably the best collection of metric teaching materials

The newest organization is

National Association for Metric Education - primarily at stages of paperwork with an eye on national metric curriculum in the future

Metrication - issues of journals

*Feb. 1975 - Audiovisual Instruction

*American Metric Journal

Timely reporting and specific articles of interest and use to educators. Advertisements are a good source list for teaching and information materials.

Activities

You may well ask are we expected to move metric into schools overnight? Certainly not. The U. S. Customary system is a part of the child's everyday world. He will hear about it at home and see it all about him. Traffic signs are still for the most part posted in miles although some states have moved to post distance in kilometers. Recipes are still in cupsful and teaspoonsful. Although recipes are appearing calling for such ingredients as 3 centiliters salft and 3 deciliters heavy cream. Thus, you are advised to see the most emphasis be placed on metric units, but not to completely exclude the U. S. Customary units.

There is reason to expect some confusion. Many of us have had experience with some metric measures in our study of measurement, during our school education. You will recall, however, that much attention was focused on converting from Customary units to metric units and from metric units to Customary units. There is little to be gained by so doing. Students should be taught to think metric in the first place. There are two sets of units of measure. One learns to use both.

As in the past, change can be expected to move slowly. For those who have been using the Customary Units, we will need a little time. But we have made changes before and we can do it again. Our mode of travel hasn't always been the same. We seem to do very well without the ink bottle and the fountain pen. If appropriately taught, school children will do very well. Experience in Canada and Great Britain in recent years shows that it is much easier for children to learn the metric system than the British system. Thus, children who are not already deeply tinctured with the Customary system will have a much easier time than will adults.

A professional "anxiety" that at least I have is that there can be too big an issue made of moving to metric. Somehow we have a tendency to make changes seem most difficult. Perhpas it has already become too much of an issue with the creation of special journals, special organizations and so on.

A concluding statement

In conclusion schools are moving into metric. Textbook publishers have responded to metrication. There are some 200 producers of metric instructional aids for educators. There are already inservice programs for faculties. Again, your role as an administrator in these efforts, your positive thinking and the use of the rule of common sense all should make for a smooth transition. THINK METRIC. GO METRIC.